CLAIMS

1. A method of controlling the growth of a plant and/or the expression of at least one wounding or pathogen response gene in said plant, the method comprising altering in the plant the level of the gene product of a MAPK4 gene.

2. A method according to claim 1, wherein the level of the gene product of a MAPK4 gene is altered in the plant by the following steps

a) providing a recombinant DNA construct in a suitable vector in which the coding region of a MAPK4 gene is operably linked in an anti-sense orientation to an appropriate promoter such that the expression of the MAPK4 gene is regulated by said promoter;

b) transforming regenerable cells of a plant with said recombinant DNA construct; and

c) regenerating a transgenic plant from said transformed cell.

3. A method according to claim 2 wherein the transformation with the antisense MAPK4 construct leads to an increased content of salicylic acid (SA) in the transgenic plant.

4. A method according to claim 3 wherein the increased content of salicylic acid results in the induction of a SA-dependent systemic acquired resistance (SAR).

5. A method according to claim 2 wherein the DNA construct comprises a further MAPK4 gene which is operably linked to an appropriate promoter, such that the expression of that further MAPK4 gene is regulated by said promoter.

6. A method according to claim 5 wherein the further MAPK4 gene is overexpressed.

7. A method according to claim 5 wherein the product of the further MAPK4 gene is produced in constitutively active form.

8. A method according to claim 6 or 7 wherein the increased expression and/or activity of MAPK4 leads to an increased response to jasmonates (JAs) in the transgenic plant.

9. A method according to claim 8 wherein the increased JA-response results in the expression of JA-responsive genes selected from the group consisting of PDF1.2 and THI2.1.

10. A method according to claim 1, wherein the level of the gene product of a MAPK4 gene is altered in the plant by the following steps

a) providing a gene coding for an active MAPKK,

b) fusing said MAPKK gene with a recombinant DNA construct in a suitable vector in which the coding region of a MAPK4 gene is operably linked to an appropriate promoter such that the expression of the MAPK4 gene is regulated by said promoter, in order to obtain an activated MAPKK/MAPK4 fusion protein,

c) transforming regenerable cells of a plant with said constitutively activated MAPK4,

d) regenerating a transgenic plant from said transformed cell.

11. A method according to claim 10 wherein the expression of the MAPK4 gene is increased relative to the wild type gene.

12. A method according to claim 11 wherein the increased expression of MAPK4 leads to an increased response to jasmonates (JAs) in the transgenic plant.

13. A method according to claim 12 wherein the increased JAs-response results in the expression of JAs-responsive pathogen genes selected from the group consisting of PDF1.2 and THI2.1.

14. A method according to claim 1, wherein the level of the gene product of a MAPK4 gene is altered in the plant by the following steps

a) providing a recombinant DNA construct in a suitable vector in which the coding region of a gene coding for a catalytically inactive MAPK4 is operably linked in a sense orientation to an appropriate promoter such that the expression of the catalytically inactive MAPK4 gene is regulated by said promoter;

b) transforming regenerable cells of a plant with said recombinant DNA construct; and

c) regenerating a transgenic plant from said transformed cell.

15. A method according to claim 14 wherein the product of the MAPK4 gene cannot be phosphorylated.

16. A method according to claim 14 wherein the product of the inactive MAPK4 gene is non-phosphorylatable.

17. A method according to any of claims 2 to 16 wherein the promoter is a constitutive promoter.

18. A method according to claim 17 wherein the constitutive promoter is selected from the group consisting of cauliflower mosaic virus 35S promoter, cauliflower mosaic virus 90 with G-box 10 tetramer promoter, maize Adh promoter, maize ubiquitin Ubi -I promoter and rice Act1 promoter.

19. A method according to any of claims 2 to 16 wherein the promoter is an inducible promoter.

20. A method according to claim 19 wherein the inducible promoter is selected from the group consisting the tetracycline repressor/operator controlled promoter, ecdysone agonist inducible promoter, glucocorticoid agonist inducible promoter, copper inducible promoter, ethanol inducible promoter, and tobacco wun 1 promoter.

21. A method according to claim 1, wherein the level of the gene product of a MAPK4 gene is altered in the plant by the following steps

a) mutating in a regenerable plant cell the MAPK4 gene so as to obtain a loss of function of said gene, and

b) regenerating a transgenic plant from said transformed cell.

22. A method according to claim 21 wherein the mutation is provided by inserting an insertion element within the MAPK4 gene.

23. A method according to claim 22 wherein the insertion element is selected from the group consisting of a T-DNA and a transposon.

24. A method according to any of claims 1 to 23 wherein the wounding or pathogen response gene is a gene coding for a gene product selected from the group consisting of chitinase, extensin (EXT1), β-1,3-glucanase (BGL2/PR2), β-1,3-glucanase (BGL3), glutathione S-transferase (ERD11), glutathione S-transferase (PM24), monodehydro-ascorbate reductase, pectin methylesterase (PME1), a lipid transfer protein (MTE17.7), a LRR receptor kinase, hypothetical protein, LRR-receptor kinase, oxalate oxidase-like (GLP5), a proline-rich protein and a hypothetical protein.

25. A method according to any of claims 1 to 24 wherein the wounding or pathogen response gene is overexpressed.

26. A method according to any of claims 1 to 25 wherein the overexpression results in an enhanced resistance to plant pathogens selected from the group consisting of viruses, fungi, bacteria, insects and nematodes.

27. A method according to any of claims 1 to 26 wherein the transgenic plant, relative to a wild type plant, has a reduced growth.

28. A method according to any of claims 1 to 27 wherein the plant is a monocot or a dicot.

29. A method according to any of claims 1 to 28 wherein the MAPK4 is AtMPK4 derived from *Arabidopsis thaliana*.

30. A transgenic plant having enhanced wound and/or disease resistance, said plant comprising an antisense MAPK4 construct, wherein said construct leads to an increase in the expression of wounding and/or pathogen responsive genes.

31. A transgenic plant having enhanced wound and/or disease resistance, said plant comprising a constitutively active form of MAPK4.

32. A transgenic plant having enhanced wound and/or disease resistance, said plant comprising a catalytically inactive MAPK4 construct, wherein said construct leads to an increase in the expression of wounding and/or pathogen responsive genes.

33. A transgenic plant having enhanced wound and/or disease resistance, said plant comprising a mutation in the MAPK4 gene which results in a loss of function of said gene, wherein said mutation leads to an increase in the expression of wounding and/or pathogen responsive genes.

34. A transgenic plant according to any of claims 30 to 33 wherein the plant, relative to the wild type plant, has reduced growth.

35. A transgenic plant according to any of claims 30 to 34 wherein the plant is a monocot or a dicot.

36. A recombinant DNA construct comprising the coding region of MAPK4 gene operably linked in an antisense orientation to an appropriate promoter.

37. A transgenic plant cell transformed with the DNA construct of claim 36.

38. A method of screening a plant population for plants carrying an insertion element within the MAPK4 gene whereby the gene is functionally inactivated, the method comprising the steps of

a) providing a MAPK4 specific primer and an insertion element specific primer,

b) providing DNA of each of said plants,

c) performing PCR reactions using said primers, and

d) selecting a plant carrying an insertion element within the MAPK4 gene whereby the gene is functionally inactivated by identifying a PCR product primed by said primers.

39. Use of a MAPK4 gene for providing MAPK4 primers useful in the method according to claim 38.